

SPICES
and **TAPES**
for
Rubber Insulated Wires

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SPICES *and* TAPES *for* Rubber Insulated Wires

The Importance of a Perfect Splice

The Important Properties of Tape

How to Recognize These Properties
and

How to Make a Perfect Splice

The Okonite Company

FOUNDED 1878

The Okonite-Callender Cable Company, Inc.

Factories: PASSAIC, N. J.

PATERSON, N. J.

Sales Offices:

New York · Chicago · Pittsburgh · St. Louis

Atlanta · Birmingham · San Francisco

Los Angeles



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The Okonite Company
The Okonite-Callender Cable Co., Inc.

The Importance of a Perfect Splice

WHEN it is realized that one bad joint can ruin the best wiring system and entirely nullify the value of the highest grade insulation, and that a perfect joint can easily be made by using proper methods, care and good materials, then the lack of foresight and the false economy in not securing a perfect joint becomes obvious. Especially so when the difference in cost between a perfect and a bad joint is so small as to be hardly measurable.

It is important not only that the workman be properly instructed but that engineering study be made of the quality and suitability of the rubber insulating tape and of the protective adhesive tape used.



Insulating the Joint, and the Necessary Properties of the Splicing Compound

It is essential that a joint in a rubber insulated wire should be insulated with a homogeneous mass of rubber firmly joined to the conductor and to the wire insulation and having characteristics similar to the insulation of the wire.

The most practicable method of applying this joint insulation is in the form of unvulcanized rubber tape.

Vulcanized rubber tape will not coalesce into a homogeneous mass after application and in consequence it is difficult if not impossible to make a satisfactory water tight joint with it. Low grade splicing compounds containing shoddy instead of new live rubber are usually semi-vulcanized so as to meet the tensile strength requirements of specifications.

Adhesive or rubber faced cloth tapes will not insulate a joint as capillary action of the cotton fibres will permit the entrance of moisture with eventual failure.

A perfect splicing compound therefore should have the following characteristics:—

Must be made of the highest grade rubber. Should be absolutely unvulcanized in order to mould into a perfectly homogeneous mass. Should have the highest dielectric strength and insulating resistance.

Should be properly compounded so that once moulded in place a moderate amount of heat will absolutely set the splice.

The manufacturing processes should be conducted with the highest degree of refinement, under skilled and experienced supervision.





Okonite Tape

We guarantee Okonite Tape:

To be made (like Okonite insulation) with Up-River Fine Para Rubber, washed free from impurities and air dried, and with compounding ingredients selected, prepared and mixed with the same care that characterizes all Okonite products.

To readily mould into a homogeneous mass and when properly applied to make a joint impervious to moisture and equal electrically and mechanically to the insulated wire itself.

To have fifty-six feet per pound of $\frac{3}{4}$ " tape—other widths in proportion.

To be made with all the skill and knowledge resulting from forty-seven years experience.





Okonite Tape is made in one color—slate. It is wrapped in paraffined paper and packed in paper cartons in the following standard widths and weights:

Width (inches)	Net Weight per roll (ounces)
$\frac{1}{2}$	8
$\frac{3}{4}$	8
1	16
$1\frac{1}{2}$	16
2	16

Any width and weight roll can be made, but unless otherwise specified $\frac{3}{4}$ " width in 8-ounce rolls will be furnished on orders.

To insure proper adherence of the splicing compound to both the copper and the wire insulation it is advisable to coat both with a small quantity of rubber cement.



Okonite Cement

Okonite Cement is pure rubber in a suitable solvent. Only a very small quantity is necessary in making a perfect splice. It is packed in two-ounce, eight-ounce, or sixteen-ounce cans.





Protecting the Insulated Joint, and the Necessary Properties of Adhesive Tape

The principal function of an adhesive tape in wire and cable splicing is to provide a firmly adhering, weather resisting mechanical protection to a splice already properly insulated.

There are many grades of adhesive tape, a few of a quality suitable for the purpose for which they are intended—many others entirely unsuitable for any service. In the former class, quality must be the sole consideration, irrespective of manufacturing cost; in the latter class, quality is ignored in favor of low production cost.

The essential characteristics by which the quality of an adhesive tape should be judged are:—

1. Adhesiveness,
2. Uniformity, toughness and durability of the fabric,
3. Weathering qualities.

Adhesiveness: The usual off-hand method of judging the adhesive qualities of a tape is to see if it "feels sticky." There is, however, a vast difference between "adhesiveness" and "stickiness." Excessive "stickiness" is obtained at a sacrifice of the much-to-be-desired "adhesive" strength.

High adhesive strength can only be obtained by forcing into and through the fabric by means of rolls a high quality adhesive rubber compound. This process is known as calendering and is the only process by which a true "friction" tape can be made.

The adhesive materials used in most tapes are weak, sticky compounds, containing a large proportion of shoddy, compounded with softening materials such as liquid asphalt and applied to the fabric by means of a spreading machine, after further softening with a volatile solvent, such as benzole.





A rubber compound softened with these volatile solvents never recovers its original adhesive properties after the solvent has evaporated and a tape so manufactured is not a "friction" tape.

There are many brands of cheap tape on the market which, while far more "sticky" than a high grade tape, will not pass test for adhesive strength.

Adhesiveness can only be determined by exact test methods. A number of methods have been proposed, some of which unroll the tape at a definite speed and measure the pounds pull; others apply a definite pull and measure the rate of unrolling. The latter method is now most generally used and a good example is that given in A. S. T. M. Specification D-69-24 as follows:

"The adhesion between adjacent layers of the tape shall be such that when a strip of tape 2 feet long is taken from a roll and wound upon a mandrel one inch in diameter, under a tension of 10 pounds per inch of width at a rate of 30 inches per minute and allowed to stand for three minutes with the weight attached, a weight of 4 pounds per inch of width shall not cause the plies to separate at a rate greater than 30 inches per minute.

"The test shall be made at a room temperature not less than 21.1°C. (70°F.) nor more than 23.9°C. (75°F.), the sample having been kept within these limits for at least 30 minutes immediately preceding the time of testing.

"The mandrel shall be so free in its bearings that a weight of 1 ounce will cause it to revolve freely when suspended from a cotton string wound in a single layer on the center of the mandrel."

Care should be taken to carry out with exactness all the test conditions as a variation in any detail will entirely alter the results.

It will be found that many brands of tape will show a rate of separation so fast as to indicate no adhesion, whereas the very highest grade (Manson) will show about 4 inches a minute.





Fabric: The toughness and durability of the fabric are determined by the quality of the cotton, the closeness of the weave and the tensile strength. A high grade tape should have a tensile strength not less than 40 lbs. per inch of width.

Weathering or Aging: There is at present no unquestioned means of satisfactorily determining the aging or weathering qualities of a tape except by actually exposing the tape to weather conditions.

A forecast as to the service which may be expected, however, may be made with some degree of certainty if the exact composition of the frictioning compound is known.

If only new rubber of the best quality is used and if every ingredient is new and is carefully tested for purity, uniformity and constancy, it may be concluded that a far more lasting tape will be produced than if second-hand and non-uniform materials, such as shoddy, or other substitutes for rubber enter into or form a part of the composition.

Our guarantees are based on our knowledge of the truth of this principle—a knowledge gained by our experience of forty-seven years.





Manson Tape

We guarantee "Manson" Tape:

To be a true Friction Tape, having a closely woven cotton fabric of highest quality into which has been frictioned (on both sides) a rubber compound containing only new Hevea rubber with high and best quality chemically pure admixture.

To be unequalled in aging or weathering quality, and invite comparative tests under actual weather conditions.

To be unequalled in true adhesiveness. It will not separate at a rate greater than 4 inches per minute under the test conditions previously given.

To be unequalled for any service demanding a high quality friction tape.

To have 80 feet per 8 oz. roll of $\frac{3}{4}$ " tape—other widths in proportion.





Manson Tape can be furnished in two colors—black or white. It is packed in tin boxes in the following standard widths and weights.

Width (inches)	Net weight per roll (ounces)
$\frac{1}{2}$	8
$\frac{3}{4}$	8
1	8
$1\frac{1}{2}$	16
2	16

Any width and weight roll can be made, but unless otherwise specified, $\frac{3}{4}$ " black Manson will be furnished on orders.



Dundee "A"

We guarantee Dundee "A" Tape:

To be a true friction tape composed of a closely woven, tough cotton fabric, thoroughly frictioned with a high grade rubber compound which consists of new rubber and suitable ingredients required to give the tape the desired characteristics.





That it will not separate at a rate greater than 10" per minute under the test conditions previously given.

To have 83 feet per 8 oz. roll of $\frac{3}{4}$ " tape, other widths in proportion.

Dundee "A" is made in one color—black. It is wrapped in foil and packed in paper cartons in the following standard widths and weights:

Widths (inches)	Net weight per roll (ounces)
$\frac{1}{2}$	4 or 8
$\frac{3}{4}$	4 or 8
$1\frac{1}{2}$	16
2	16

Any width and weight roll can be made, but unless otherwise specified $\frac{3}{4}$ " width in 8 ounce rolls will be furnished on orders.



Dundee "B"

We guarantee Dundee "B" Tape:

To be a true friction tape having an adhesive compound containing only new rubber, frictioned into a good quality closely woven cotton fabric.





That it will not separate at a rate greater than 15" per minute under test conditions previously given.

To have 65 feet per 8 oz. roll of $\frac{3}{4}$ " tape, other widths in proportion.

Dundee "B" is made in one color—black. It is wrapped in foil and packed in paper cartons in the following standard widths and weights.

Width (inches)	Gross weight per package (ounces)
$\frac{1}{2}$	4 or 8
$\frac{3}{4}$	4 or 8
1	8

Any width and weight roll can be made, but unless otherwise specified $\frac{3}{4}$ " width in 8 ounce rolls will be furnished on orders.

We recommend the use of OKONITE Tape in all cases for insulation of rubber insulated wires and cables.

OKONITE Cement — as an adjunct to OKONITE Tape.

MANSON Tape — where highest quality and permanence under weather conditions are the sole considerations.

DUNDEE "A"—where high quality and long life are wanted, but where cost is a consideration.

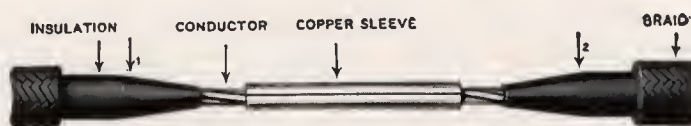
DUNDEE "B"—where a good grade of friction tape is wanted at a modest price.





How to Make a Perfect Joint

In Rubber Insulated Wires



1. *Preparing the Conductor Ends.* Trim back the conductor, insulation, and braid as per illustration, using a very sharp knife to bevel the insulation.

Be sure that the tape or braid is cut back evenly, so that there will be no loose cotton fibres to interfere with the proper insulating of the conductor.

2. If the conductor joint is made with a copper sleeve, sweat the sleeve on. If made by twisting the two ends together, see that the ends do not protrude, and carefully solder, cleaning off all surplus.

3. Cover the bevels and conductor with OKONITE Rubber Cement and allow this to "set" (which takes about one minute).

4. *Insulating the Joint.* Take a strip of $\frac{3}{4}$ " OKONITE Tape six to eight inches long, and beginning at the bevel on a level with the insulation¹, wrap spirally (seeing that the turns overlap) to the other side of the joint as far as the high point of the bevel on that side². Continue to wrap to and fro until the joint is built up slightly thicker than the wall of insulation. The tape must be put on under tension, say, stretched to about half its width.

5. *To Partially Vulcanize the Joint.* Apply heat from a spirit lamp, or any other convenient medium, for about one





minute, evenly around the joint, being careful not to burn the insulation.

6. Finish off with two layers of MANSON Tape, applied so as to completely cover the joint and overlap the braid.

7. Cleanliness and ordinary care is most important throughout all operations.

Note: Should OKONITE Tape become slightly set, as in extreme cold weather, warming will restore it to its normal condition.





Okonite Products

Okonite and Varnished Cambric Wires and Cables

Any Size and Number of Conductors. Any Voltage. Any Service.

Braided, Lead Covered, Steel Braid, Steel Taped, Steel Wire Armored

Okocord · Okoloom · Railway Signal Wire
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Pot Heads · Okonite Cement · Okonite Tape
Manson Tape · · Dundee "A" & "B" Tapes

Okonite-Callender Products

Impregnated Paper Cables · Super-tension Cables

Splicing Materials

SALES OFFICES

The Okonite Company
The Okonite-Callender Cable Company, Inc.

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ATLANTA, GA.	Candler Building, 129 Peachtree Street
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